



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/594,249

09/25/2006

Hajime Saito

0033-1107PUS1

7406

2292 7590 12/18/2009
BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

GREEN, TRACIE Y

ART UNIT

PAPER NUMBER

2879

NOTIFICATION DATE

DELIVERY MODE

12/18/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/594,249	Applicant(s) SAITO ET AL.	
	Examiner Tracie Green	Art Unit 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 September 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 8-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 8-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Receipt is acknowledged of applicant's amendment filed 09/17/2009. Claims 4-7 cancelled by applicant. Claims 1-3, 5-6, and 8-18 are pending and an action on the merits is as follows.
2. Applicant's amendments with respect to claims 1, 3, and newly added claims 11-18 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 8, 10, 12, 13, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheetham et al. (US 2005/0077499 A1) in view of Tanaki et al. (US 6,780,346).

Regarding claim 1, Cheetham teaches a light-emitting device comprising: a semiconductor excitation light source emitting blue-violet light, and a solid material illuminant that is made up of a medium that transmits the blue-violet light with low loss (¶6, lines 1-4) and an absorbent for absorbing said blue-violet light (¶6, lines 1-5, the absorbent containing Sm of 0.01 to 10 mol% (¶ 33, lines 13-16) (*Examiner notes: prior art teaches that the phosphor can have up to 55% mole of Sm, this falls within the range*

Art Unit: 2879

as disclosed thus meeting the limitation as claimed) wherein said solid material illuminant radiates light by inner shell transition of the Sm contained in the absorbent absorbing the blue-violet light (¶6, lines 7-13) *(prior art reveals that the red phosphor containing the Samarium absorbs a portion of emitted light from the GaN to radiate a red light in a different wavelength),*

Cheetham is silent regarding said solid material illuminant medium is selected from the group consisting of GaN, AlN, InGaN, InAlN, InGaAlN, Si₃N₄, GaNP, AlNP, InGaNP, InAlNP, InGaAlNP, GaNAs, AlNAs, InGaNAs, InAlNAs, InGaAlNAs, GaNAsP, AlNAsP, InGaNAsP, InAlNAsP, InGaAlNAsP, ZnSe, and ZnSSe.

In the same field of endeavor Tanaki et al. teaches said solid material illuminant medium is selected from the group consisting of GaN, AlN, InGaN, InAlN, InGaAlN, Si₃N₄, GaNP, AlNP, InGaNP, InAlNP, InGaAlNP, GaNAs, AlNAs, InGaNAs, InAlNAs, InGaAlNAs, GaNAsP, AlNAsP, InGaNAsP, InAlNAsP, InGaAlNAsP, ZnSe, and ZnSSe (Column 2, lines 25-35) (GaN) in order to provide a device with improved luminous efficiency (Column 2, lines 20-23).

Therefore one of ordinary skill in the art at the time of the invention could modify the device of Cheetham wherein said solid material illuminant medium is selected from the group consisting of GaN, AlN, InGaN, InAlN, InGaAlN, Si₃N₄, GaNP, AlNP, InGaNP, InAlNP, InGaAlNP, GaNAs, AlNAs, InGaNAs, InAlNAs, InGaAlNAs, GaNAsP, AlNAsP, InGaNAsP, InAlNAsP, InGaAlNAsP, ZnSe, and ZnSSe in order to provide a device with improved luminous efficiency as taught by Tanaki et al.

Regarding claims 2, Cheetham teaches wherein said blue-violet light has a peak wavelength in the range of 398 to 412 nm (§15, lines 1-4) (*Examiner note: prior art reference teaches the range of 200-620nm which includes the range as disclosed*)

Regarding claim 8, Cheetham teaches wherein said solid material illuminant contains a red phosphor having a peak wavelength in the range of 600 to 670 nm (Paragraph 20, line 5) (*examiner note: prior art reveals 580 to 700 for red*), a green phosphor having a peak wavelength in the range of 500 to 550 nm (Paragraph 20, line 4) (*examiner note: prior art reveals 500-580 for green*) and a blue phosphor having a peak wavelength in the range of 450 to 480 nm (Paragraph 20, line 5) (*examiner note: prior art reveals 400 to 500 for blue*)

Regarding claim 10, Cheetham teaches wherein said red phosphor contains at least either Sm or Eu (Table 1 or Table 2).

Regarding claim 12, Cheetham teaches (Figures 4-7) A light-emitting device comprising: a semiconductor excitation light source (§6, lines 1-4) emitting blue-violet light (GaN), and a solid material illuminant that is made up of a medium that transmits the blue-violet light with low loss (§6, lines 1-4) and an absorbent for absorbing (§6, lines 5-16) said blue-violet light, the absorbent containing Sm of 0.01 to 10 mol% (§ 33, lines 13-16) (*Examiner notes: prior art teaches that the phosphor can have up to 55% mole of Sm, this falls within the range as disclosed thus meeting the limitation as claimed*) wherein said solid material illuminant radiates light by inner shell transition of the Sm contained in the absorbent absorbing the blue-violet light (§6, lines 7-13) (*prior*

Art Unit: 2879

art reveals that the red phosphor containing the Samarium absorbs a portion of emitted light from the GaN to radiate a red light in a different wavelength),

Cheetham is silent regarding said solid material illuminant medium contains at least one of nitrides of Ga, In, and Al (GaN).

In the same field of endeavor Tanaki et al. teaches said solid material illuminant medium contains at least one of nitrides of Ga, In, and Al (GaN) (Column 2, lines 25-35) (GaN) in order to provide a device with improved luminous efficiency (Column 2, lines 20-23).

Therefore one of ordinary skill in the art at the time of the invention could modify the device of Cheetham wherein said solid material illuminant medium contains at least one of nitrides of Ga, In, and Al (GaN) in order to provide a device with improved luminous efficiency as taught by Tanaki et al.

Regarding claim 13, Cheetham teaches wherein said blue-violet light has a peak wavelength in the range of 398 to 412 nm (¶15, lines 1-4) (*Examiner note: prior art reference teaches the range of 200-620nm which includes the range as disclosed*)

Regarding claim 16, Cheetham teaches wherein said solid material illuminant contains a red phosphor having a peak wavelength in the range of 600 to 670 nm (¶ 20, line 5) (*examiner note: prior art reveals 580 to 700 for red*), a green phosphor having a peak wavelength in the range of 500 to 550 nm (¶ 20, line 4) (*examiner note: prior art reveals 500-580 for green*) and a blue phosphor having a peak wavelength in the range of 450 to 480 nm (¶20, line 5) (*examiner note: prior art reveals 400 to 500 for blue*)

Art Unit: 2879

5. Claims 3, 11, 14-15, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheetham et al. (US 2005/0077499 A1) in view Tanaki et al. (US 6,780,346) as applied to claims 1 and 12, and in further view of Henrichs (US 6,625,195 B1).

Regarding claims 3, 11, and 14-15, Cheetham as modified by Tanaki et al. teaches the light-emitting device set forth above (see claim rejections 1-2 and 12-13). Cheetham teaches wherein said semiconductor excitation light source emitting blue-violet light is a semiconductor laser (§15, lines 1-3). Cheetham as modified by Tanaki et al, is silent regarding wherein said a semiconductor laser device having a narrow spectral line width of lasing (claims 3 and 14) with an active layer of InGaN semiconductor (claims 11 and 15).

In the same field of endeavor of light-emitting devices, Henrichs teaches wherein said is a semiconductor laser device having a narrow spectral line width of lasing (column 2, lines 45-48) with an active layer of InGaN semiconductor (column 2, lines 28-30) in order to provide a device with improved current correction that allows for beam coherence and laser beam divergence (column 2, lines 10-15).

Therefore one of ordinary skill in the art at the time of the invention could further modify the light emitting device of Cheetham wherein said semiconductor excitation light source emitting blue-violet light is a semiconductor laser having a narrow spectral line width of lasing with an active layer of InGaN semiconductor in order to provide a device with improved current correction that allows for beam coherence and laser beam divergence as taught by Henrichs.

Regarding claim 18, Cheetham teaches wherein said red phosphor contains at least either Sm or Eu (Table 1 or Table 2).

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheetham et al. (US 2005/0077499 A1) in view of Tanaki et al. (US 6,780,346) as applied to claims 1 and 12, and in further view of Juestel et al. (US Patent 6,084,250).

Cheetham as modified by Tanaki et al teaches the light-emitting device set forth above (see rejection claim 1). Cheetham teaches wherein both red (Sm) and blue (Eu) contain a rare earth element. Cheetham as modified by Tanaki et al. is silent concerning the green phosphor also has rare earth elements.

In the same field of endeavor of light-emitting devices, Juestel teaches wherein said red phosphor (for example, $\text{YVO}_4\text{:Eu}$), said green phosphor (for example, BAM:Eu activated) and said blue phosphor (for example, BAM:Eu activated) each contain rare earth elements (Column 4, table 1) in order to provide a device with high color rendering to display light efficient and intense image (Column 1, lines 54-56).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify light-emitting device of Cheetham wherein green, red and blue phosphors each contain a rare earth element, but is silent concerning all the phosphors, red green and blue have rare earth elements in order to provide a device with high color rendering to display light efficient and intense image as taught by Juestel et al.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheetham et al. (US 2005/0077499 A1), in view of Tanaki et al. (US 6,780,346) as

Art Unit: 2879

applied to claims 1 and 12. in view, of Henrichs (US 6,625,195 B1) as applied to claims 3, 11, and 14-15, and in further view of Juestel et al. (US Patent 6,084,250).

Cheetham as modified by Tanaki et al. and Henrichs teaches the light-emitting device set forth above (see rejections claims 12 and 15). Cheetham teaches wherein both red (Sm) and blue (Eu) contain a rare earth element. Cheetham as modified by Tanaki et al. and Henrichs is silent concerning the green phosphor also has rare earth elements.

In the same field of endeavor of light-emitting devices, Juestel teaches wherein said red phosphor (for example, $\text{YVO}_4\text{:Eu}$) said green phosphor (for example, BAM: Eu activated) and said blue phosphor (for example, BAM:Eu activated) each contain rare earth elements (Column 4, table 1) in order to provide a device with high color rendering to display light efficient and intense image (Column 1, lines 54-56).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify light-emitting device of Cheetham wherein green, red and blue phosphors each contain a rare earth element, but is silent concerning all the phosphors, red green and blue have rare earth elements in order to provide a device with high color rendering to display light efficient and intense image as taught by Juestel et al.

Response to Arguments

8. Applicant's arguments with respect to amended claim 3 and added claims 11-18 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's arguments filed 09/17/2009 have been fully considered but they are not persuasive. Specifically, applicant argues that Cheetham fails to teach or suggest a range of .01 to 10% mol of Samarium thus fails to anticipate and render obvious the claimed invention as amended.

Examiner respectfully disagrees with applicant, as applicant acknowledges on page 6 of remarks, Cheetham teaches in ¶33, Cheetham teaches Samarium(Sm) of up to about 5 % more. First, 5 % mole falls within the range as disclosed in the claims and that which is stated on page 7, lines 1-5. Also as claimed in subsequently claimed in claims 10 and 18, the applicant claims a red phosphor with the Sm component and again on page 7 of the disclosure recites the range of claim one as a preferred range of Sm. Again Cheetham rightly anticipates/renderers obvious due to the fact that as understood by the applicant and noted by the ¶33 Cheetham.

Applicant further argues as if the claim language supports that the Sm is an additional component added to "a solid illuminant material which consists of a nitride based semiconductor and a mixture phosphors". When in fact, the claims as well as the disclosure support the introduction of the absorbent in the form of a phosphor and more particularly a red phosphor. Cheetham's disclosure rightly anticipates, renders obvious and suggests the invention as recited in claims 1 and 13, as well as the applicant's

Art Unit: 2879

disclosure. All arguments having been addressed, examiner believes rejections to be proper.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 6,277,664 teaches a narrow spectral line-width blues laser using nitride based semiconductor material. US 6,531,072 teaches a phosphor compound containing gallium nitride.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2879

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracie Green whose telephone number is (571)270-3104. The examiner can normally be reached on Mon-Thurs 7:00am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Tracie Green/
Examiner, Art Unit 2879

/Sikha Roy/
Primary Examiner, Art Unit 2879